

Claims

[c1] What is claimed is:

1. A reverse gate comprising:

a first scoop having an inlet and an outlet;

a second scoop having an inlet and an outlet;

wherein the inlet of the first scoop intersects the inlet of the second scoop and forms an apex thereat; and

wherein the apex is offset from a center of the reverse gate.

[c2] 2. The reverse gate of claim 1 further comprising a first bracket attached to the first scoop outlet and a second bracket attached to the second scoop outlet wherein the first and second brackets are constructed to attach to a stationary nozzle of a watercraft.

[c3] 3. The reverse gate of claim 2 wherein the first and the second brackets have a hole at an end constructed to engage a pivot pin therein to attach the reverse gate to a watercraft.

[c4] 4. The reverse gate of claim 1 further comprising a third scoop constructed integrally with the first scoop.

- [c5] 5. The reverse gate of claim 1 wherein the first scoop is larger than the second scoop.
- [c6] 6. The reverse gate of claim 1 wherein the first scoop and the second scoop are curved about at least two axes.
- [c7] 7. The reverse gate of claim 1 incorporated into a watercraft having at least two propulsion sources wherein each propulsion source has a respective reverse gate mounted to rotate thereover.
- [c8] 8. A reverse gate assembly for a watercraft comprising:
a steering nozzle having a center axis and pivotably attached to a watercraft;
a reverse gate having a first curved section and a second curved section attached to the first curved section;
a divider extending outwardly from the reverse gate between the first and the second curved sections; and
wherein the divider is offset from the center axis of the steering nozzle.
- [c9] 9. The assembly of claim 8 wherein the first curved section is longer than the second curved section and the divider is an apex.
- [c10] 10. The assembly of claim 8 wherein the divider is offset from a pivot axis of the steering nozzle such that more of a discharge from the steering nozzle is directed onto

the first curved section than onto the second curved section when the center axis of the steering nozzle is generally parallel to a center line of the watercraft.

- [c11] 11. The assembly of claim 8 further comprising a stator nozzle located in front of the steering nozzle and having the reverse gate attached thereto.
- [c12] 12. The assembly of claim 8 further comprising a first bracket attached to each of the first and second curved sections and constructed to pivotally attach the reverse gate to the watercraft at a position forward of the steering nozzle.
- [c13] 13. The assembly of claim 8 further comprising a third curved section within the first curved section.
- [c14] 14. The assembly of claim 8 incorporated into a watercraft having at least two sources of propulsion.
- [c15] 15. A jet-propulsion system of a watercraft comprising:
 - a first and second jet-propulsion outlets;
 - a first and second steering nozzles, each having a center and rotatably attached to a respective one of the first and second jet-propulsion outlets;
 - a first and second reverse gates, each having a midpoint and an apex, and attached to a respective one of the first and second jet-propulsion outlets; and

wherein the apex of the first and second reverse gates is offset from the respective midpoint and the center of the respective steering nozzles.

[c16] 16. The system of claim 15 wherein the steering nozzles are rotatable relative to the first and second jet-propulsion outlets and the first and second reverse gates.

[c17] 17. The system of claim 15 wherein the first and second reverse gates each further comprise a pair of mounting brackets constructed to engage a pivot pin.

[c18] 18. The system of claim 15 wherein the first and second reverse gates each further comprise a first, a second, and a third curved sections and wherein the third curved section is contained within the first curved section.

[c19] 19. The system of claim 15 wherein the first and second reverse gates each has a variable vertical position relative to the steering nozzle.

[c20] 20. The system of claim 15 wherein the first and the second reverse gates and substantially mirror images of each other when connected to a watercraft.

[c21] 21. A method of providing steering control to a watercraft comprising:

providing a reverse gate in a flow from a steering nozzle;
separating the flow across the reverse gate into a first
and a second flow;
redirecting the first flow in a direction generally opposite
to the flow from the steering nozzle when the steering
nozzle is generally perpendicular to the reverse gate and
redirecting the second flow in a second direction gener-
ally perpendicular to the flow from the steering nozzle;
and
wherein the first flow is greater than the second flow
when the steering nozzle is generally perpendicular to
the reverse gate.

[c22] 22. The method of claim 21 further comprising varying
the first and second flows in an inverse proportional re-
lationship depending on a position of the steering nozzle
relative to the reverse gate.

[c23] 23. The method of claim 21 further comprising providing
a second reverse gate having a generally mirror image of
the first reverse gate.

[c24] 24. The method of claim 21 further comprising providing
another reverse gate and another steering nozzle
wherein when the steering nozzles are directed substan-
tially to starboard of the watercraft, the flow across the
first reverse gate is not separated and the flow across

the second reverse gate is separated, and when the steering nozzles are directed substantially to port of the watercraft the flow across the first reverse gate is separated and the flow across the second reverse gate is not separated.

[c25] 25. The method of claim 21 wherein the step of redirecting the first flow generates a lateral component and a reverse component and the step of redirecting the second flow generates primarily a lateral component.

[c26] 26. A reverse gate comprising:
a mounting arrangement designed to mount the reverse gate about a nozzle;
a first scoop having an inlet and an outlet;
a second scoop having an inlet and an outlet;
wherein the inlet of the first scoop intersects the inlet of the second scoop and forms an apex thereat; and
wherein the apex is offset relative to the nozzle that the reverse gate is mounted thereto.

[c27] 27. The reverse gate of claim 26 wherein the apex is further offset from a center axis of the reverse gate.

[c28] 28. The reverse gate of claim 26 incorporated into a watercraft having at least two jet-propulsion systems.

[c29] 29. A reverse gate as shown in the figures.

